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Pericardial Effusion or Epicardial Fat? Improved Discrimination with Phase-Sensitive Inversion Recovery MRI.

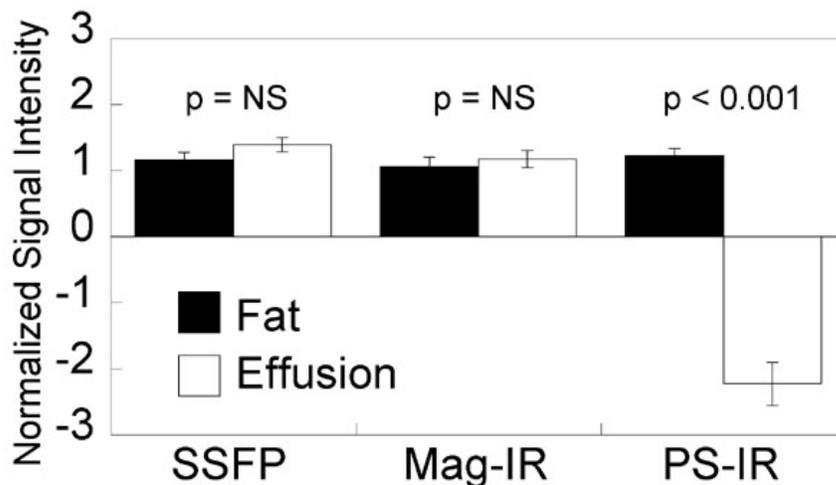
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Introduction: Pericardial effusion is a common clinical finding with potentially important implications but is easily missed using SSFP (FISP) cine and gadolinium enhanced magnitude-reconstructed inversion recovery (Mag-IR) images due to poor contrast vs. epicardial fat despite markedly different T1. Phase-sensitive inversion recovery (PS-IR) has been validated for infarct imaging and has a number of benefits.

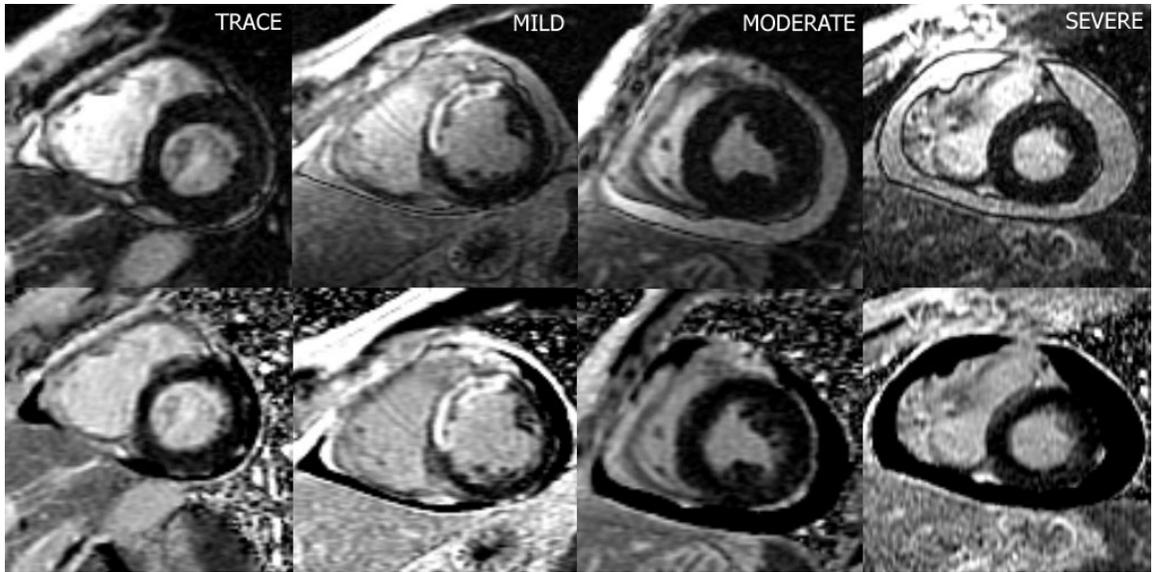
Purpose: We proposed that PS-IR would better differentiate pericardial effusion from epicardial fat because PS-IR maintains the polarity of short and long T1 tissues.

Methods: From 392 consecutive patient reports, 53 patients had a pericardial effusion (trace=28, mild=14, moderate=8, severe=3). The signal intensity of epicardial fat and pericardial effusion was measured in 14 patients imaged with all methods (SSFP, Mag-IR, PS-IR) who had more than a trace effusion.

Results: The signal intensity of fat and effusion were similar using SSFP ($p=NS$) or Mag-IR ($p=NS$). Using PS-IR, the fat is bright (positive) but the effusion is dark (negative) ($p<0.001$).



The following graphic demonstrates the signal intensity difference between Mag-IR (top row) and PS-IR (bottom row) by varying effusion size. On the Mag-IR images, blood, epicardial fat, and pericardial effusion appear bright. The PS-IR images show a dark pericardial effusion, bright epicardial fat, and dark normal myocardium.



Conclusion: While the most commonly used cardiac MRI parameters have poor contrast between pericardial effusion and epicardial fat, PS-IR reconstruction provides high quality delayed hyperenhancement images and detects effusion without lengthening the typical exam.